

## **Exploratory Factor Analysis of Managerial Entrepreneurial Competencies for Technical College Programs**

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### **ABSTRACT**

Exploratory Factor Analysis (EFA) has many useful purposes in social sciences research. The most common EFA uses between researchers involves reducing reasonably enormous variables to manageable ones, developing and sanitizing a novel instrument's scales and examining the relationships between variables to make a theory. The purpose of this study was to identify and analyzed a managerial entrepreneurial competency (MEC) for technical college programs in northwest geo-political zone of Nigeria. A quantitative research approach was used to develop insight from the experts' perspectives via a survey questionnaire. The samples of the study involved 331 experts including 249 teachers from nine technical colleges and 82 SMEs in the three states of the zone. Data collected were analyzed using Statistical Package for Social Sciences (SPSS) 24, with a value of 0.864 as the Cronbach's alpha. Moreover, the value for KMO measure of sampling adequacy equaled 0.830 and the value for Bartlett's test was significant at 0.000 level. Consequently, out of the 15 elements run for the EFA, three elements were deleted because they did not meet the prerequisite of the factor analysis. The findings identified twelve important competencies needed for integration into technical college programs curricular. Therefore, the researchers recommended that the identified managerial entrepreneurial competencies are appropriate for integration into technical college programs curricular for sustainable entrepreneurship training of technical college student for self-employment.

**INDEX TERMS:** *Managerial entrepreneurial competencies, self-employment, and technical college programs*

## I. INTRODUCTION

The main objective of establishing technical colleges is to training youths to become self-employed and self-confident. Technical, Vocational Education and Training (TVET) is one of the most functional and important human capital resource needed for Africa to accept for rapid strategic industrial revolution and national development [1]. TVET as the form of education that encompasses the training and acquisition of skills and competencies necessary for the place of work in all human endeavor that will help individual to compete favorable in international society. It has been cited in the strategy report for 2016-2021 published by UNESCO TVET that the role of TVET in alleviating poverty and employment attainment will not be over emphasizes (UNESCO-UNEVOC, 2016b, p. 4). However, with all the effort putting in place still the issue of unemployment among youths is alarming [3]. Therefore, it has to be tackled with caution by the stake holders. It is important to empower these youths to explore more avenues to attain their dream through entrepreneurship [4]. The UNESCO is always encouraging job creation among young people that is why it categorically stated [2] in addition to job and skill creation TVET should also focus on providing other skills particularly entrepreneurial skills so this would help people create their own job.

Technical entrepreneurial competencies are considerably diverse, subject to the occupational area, organization, and creativity involved. Onwuliri, [5] described entrepreneurship is skills of starting a business or stimulating an already existing business that will be uplifted to the desired recognized opportunities. The involvement of technical colleges in teaching entrepreneurial activities is an interesting feature of successful education program because the training in technical is based on thinking and operating. Technical college students should be trained and encourage to think the problem not just abstract, but how this might be solved in real life. This includes providing student with the necessary competencies that will guide them for self-employment, opportunities, and not for profit activities alone.

## II. THEORETICAL FRAMEWORK

Entrepreneurial ability is a pivot and critical in every human society. Looking at the importance and the centrality of entrepreneurship to human development, scholars have made many attempts to elucidate factors behind the presence of entrepreneurial ability among some people and its absence among others. These theories vary in nature and scope due to the differences in discipline and different approaches to the concepts and theories of entrepreneurship development. The theoretical framework developed by the researchers was based on human capital theory and multidimensional theory of entrepreneurship development to establish relationship between the training of young people towards the acquisition of the appropriate entrepreneurial mindset, knowledge and attitude toward the realization of sustainable entrepreneurship for the economic growth and national development in Nigeria.

Investing in people for seeking of enhancing the output of their production in work, termed as human capital. Schuitz, [6] observed that to enhance economic and social achievements there must be a significant investment in education. For a nation to prosper and achieve its developmental goals investment in education is a key factor. According to Becker, [7] the general human capital obtained during education can be useful to other contexts. Previously, literatures on entrepreneurial education lacked bases to establish theories that would explain the relationship between education and entrepreneurial competencies [8]. Consequently, moves have been done recently to enhance the theoretical grounding of entrepreneurial education and training (EET) [8] hence, the theory that explains clearly the impact of EET is human capital theory [7]. Human capital theory hypothesizes that people who have greater levels of competencies, their outcome performance will be greater than those who possess lower level [9]. Education, work experience, parental upbringing, an entrepreneurial activity, infrastructure and other life style are among the common human capital measures. Therefore, Human capital theory emphasizes that education and training are the most important instrument for involvement in the world economic growth.

## III. MANAGERIAL ENTREPRENEURIAL COMPETENCIES

Equipping individuals with entrepreneurial competencies would enable them to live and contribute immensely to the society. The main concept of this study is the identification of suitable

managerial entrepreneurial competencies required for the training of technical college students in Nigeria for self-employment. Hence, the development of the study evaluates the centrality of competency development for the achievement of greater development and employment growth. Since technical education is based on providing opportunities there must be a qualitative and well-planned connection between high output, occupation and economic growth. So, producing significant numbers of technical entrepreneurial qualified individuals who are able to motivate investment opportunities, create jobs and increase productivity is the main purpose for this study.

#### **IV. TECHNICAL COLLEGES CURRICULUM**

The curriculum of technical colleges in Nigeria, which is used for the training of the craftsmen is almost outdated, [10] it remains since 2001. Since the curriculum is obsolete there is urgent need to review and update it so that it will go in line with the 4<sup>th</sup> industrial revolution (4.0 IR). It has been argued [11] that, it is a generally accepted fact, that TVET has a major role to play in the achievements of sustainable development goals, but unfortunately, there are various factors that has been bedeviling technical education for a very long time, these factors have led to the failure of the program as a vital instrument for sustainable development particularly in Nigeria. It is a known fact that political, socio-economical, technological development and entrepreneurial activities goes along with the educational system of a nation. Hence the educational system must undergo changes from time to time according to the need of the individual and the society. In view of this, [12] asserted that entrepreneurship is a key factor for quick economic growth and job creation opportunities but most of the young people lack the necessary entrepreneurial competencies need for employment. Due to the high rate of unemployment in Nigeria among the teaming youth [13] opined that it is essential to integrate entrepreneurial education in technical colleges to tackle the menace of unemployment in the country. Literature [14] reiterated the necessity of inculcating entrepreneurial training into curriculum which provides a systematic teaching paradigm in all the institutions of learning. Presently the teaching and learning process and the focus of our educational system is too mechanistic, utilizing lecture method which does not encourage entrepreneurial behavior. Yousif et al. [15] point out that a new curriculum designing, that focus on continuous enhancement in the process of undertaking innovations and

entrepreneurship system should become one of the main priorities of educational institution. Now it is clear that entrepreneurship teaching emphasizes on capacity building of individual to be more entrepreneurial, in their performance, attitudes and skills in broadly diverse context; so that it has to be excess to everyone and not exclusive to certain individuals. Okon and Firday [16] states that entrepreneurial skills should be assimilated in the curriculum of technical colleges to promote human empowerment and development via entrepreneurial skills acquisition. They further reiterated that all school programs should be geared toward providing entrepreneurial competencies.

## **V. RESEARCH METHODOLOGY**

The study research methodology describes the procedure involved in carrying out the study which are discussed under relevant sub-headings below.

### **A. RESEARCH DESIGN**

In this study, descriptive survey research design has been used for the collection of the data, which includes using a questionnaire to determine the respondents' opinions and views. The research focuses on the important elements of managerial entrepreneurial competencies required by technical college students for self-employment.

### **B. SAMPLE AND SAMPLING TECHNIQUE**

The target population of the study was 891 subjects constituting 650 teachers and 241 entrepreneurs. As a result, 254 teachers and as well as 110 entrepreneurs were drawn making the sampled subjects to be 364. The samples were drawn from the population using Krejcie and Morgan table (1970). For the selection of the sample, simple sample random technique was employed by applying snow ball. The rationale for adopting this technique is that every person in the population has an equal chance of being selected [17], [18].

### **C. INSTRUMENTATION**

Questionnaire is a written tool used to obtain information on a number of issues. A 5 - Likert scale questionnaire was used for the study, with allocated scores of 4,3,2,1, and 0. Likert scale is a written instrument or data collecting tool used in survey for data collection in quantitative

research [19]. The questionnaire items were developed for the data collection based on the research questions of the study.

Subsequent to the passing of the draft questionnaire the content validity through the experts' review and pilot test of instrument, a final questionnaire was developed and was distributed to the study respondents to collect the quantitative data. The quantitative data was collected through the distribution of 364 sets of questionnaires by the researcher consequently, 331 sets were returned with a response rate of 90%.

The pilot study in this study was conducted on a small group having similar characteristic with the target population, and do not participate in the actual study. The pilot study was done after the qualitative phase had taking place. The pilot study was conducted to check the reliability of the questionnaire. In this study, the pilot study consists 20 respondents [20], [21] both from technical education teachers and entrepreneurs from Katsina state one of the states in the target population. These respondents were selected using sample random sampling. Consequently, they did not participate in the actual survey [19]. The pilot study had been published [22].

#### **D. SCOPE OF THE STUDY**

This study developed a conceptual model of entrepreneurial managerial competencies needed by the students of technical college to become self-employed in Nigeria. The delimitation of the study is the focus on the technical teachers and entrepreneurs in the north-west zone of Nigeria.

**Research Question:** What are the entrepreneurial managerial competencies needed by the students of technical college to become self-employed?

#### **VI. RESULTS**

The research findings and the data analysis were conducted to answer the research question posed in the study is hereby presented. The study sought to determine the entrepreneurial managerial competencies needed by the students of technical college to become self-employed in Nigeria.

The section covers the descriptive statistical analysis of the respondents' demographic characteristics and the inferential statistical analysis of structural equation modelling (SEM) test.

The measurement model test inclusive exploratory factor analysis (EFA) via SPSS 24, were conducted for the actual survey data in order to attain the research objective (RO) and answer the research questions RQ. Finally, to achieve the study objective a conceptual model was developed using the results of the EFA that identified the important elements of the managerial entrepreneurial competencies for integrating into technical college programs for self-employment. Therefore, to simplify the presentation of the data, a number of tables were shown for more explanation on the phenomenon.

***Demographic Information of the respondents***

Table 1 shows the frequency and the percentage of respondents according to their educational qualification and working experience. The distribution in Table 1 shows the respondents educational qualification as of 2017/2018 academic year. It can be seen that 26 of the respondents obtained Master’s degree, which represents 7.9%. Also 106 of the respondents obtained Bachelor degree representing 32.0%. Respondents with Higher National Diploma were 76 which accounts for 23.0%. The National Certificate of Education holders were 95 respondents with 28.7% representation. While those with National Diploma were 28 respondents with 8.5%. This gives the total of 331(100%) respondents.

Table 1 Demographic Information

| Respondents   | Sample | %     | Key feature               | Classification   | Freq.      | %          |
|---------------|--------|-------|---------------------------|------------------|------------|------------|
| Teachers      | 249    | 75.20 | Educational Qualification | Masters          | 26         | 7.90       |
|               |        |       |                           | Bachelor         | 106        | 32.00      |
|               |        |       |                           | HND              | 76         | 23.00      |
|               |        |       |                           | NCE              | 95         | 28.70      |
|               |        |       |                           | ND               | 28         | 8.50       |
|               |        |       |                           | <b>Sub-total</b> | <b>331</b> | <b>100</b> |
| Entrepreneurs | 82     | 24.80 | Working Experience        | 5 – 10 years     | 130        | 39.3       |
|               |        |       |                           | 11 – 15 years    | 81         | 24.5       |

|               |    |      |
|---------------|----|------|
| 16 – 20 years | 59 | 17.8 |
| 21 – 25 years | 35 | 10.6 |
| >25 years     | 26 | 7.9  |

|                          |            |  |
|--------------------------|------------|--|
| <b>Total Respondents</b> | <b>331</b> |  |
|--------------------------|------------|--|

Table 1 indicates two category of the respondents whereby technical teachers represents 249 respondents with 75.2%, whereas 82 respondents represent SMEs entrepreneurs with 24.80% of the total respondents. The Table 4.14 also shows the working experiences of the respondents that were constituted for the study. It can be seen that 130 respondents have working experience between 5 and 10 years in their fields which constituted 39.3%. The second category were those with experience between 11 and 15 years they account for 24.5% which is equivalent to 81 respondents. The third category were those with 16 to 20 years’ experience they account for 59 (17.8%) of the total respondents. Fourth category were those with experience between 21 and 25 years they were 35 respondents with 10.6%. The last but not the least category were those with over 25 years’ experience they account for 26 respondents with 7.9% only. Reliability Analyses for the Measurement Scales Table 4.15 shows the Cronbach’s alpha scores of the instrument. As for reliability analysis, the Cronbach’s alpha values of the variables are above 0.7. According to [23] any measurement instrument should have a reliability value more than 0.60. Therefore, the reliability of instruments exceeded the minimum standard levels, and was accepted.

Table 2 Reliability of the instrument

|   |      |
|---|------|
| Managerial of Entrepreneurial Competencies Cronbach’s Alpha |      |
| No. of items  | 15   |
| Cronbach’s Alpha  | .864 |

**Exploratory Factor Analysis (EFA) of Managerial Entrepreneurial Competencies**

There were 130 out of 331 samples of raw data set randomly selected using randomization function and have been run via SPSS 24.0. This section of the analysis covered the research objective and provide answer to the research question ‘What are the entrepreneurial managerial competencies needed by the students of technical college to become self-employed?’ The test the



factorial validity of the MEC model was carried out by factor analysis through structural model.

The following key applied to all the tables (where applicable) in the EFA:

KMO = Kaiser-Meyer-Olkin

MSA = Measure of Sampling Adequacy

ACS = Approximate Chi-Square,

DF = Degree of Freedom

Sig. = Significant.

This analysis was conducted to eliminate variables that are found to be poor from the EFA with a view to reducing the complexity of the model and increase the likelihood of Goodness-of-Fit for the resultant model. Here, the extraction method factor analysis was through “PCA.” While the factor rotation was conducted through “Varimax.” The selection of PCA and Varimax is because they are mostly considered as best and utmost generally used [24]. In testing the construct validity in this research; correlation matrix of (>0.3 and <0.9) for inter-item correlation calculations; >0.5 for KMO and AI’s values of (>0.5) for the correlation’s diagonal were calculated for the sampling adequacy test. Moreover, “Bartlett's test” of (Sig. at 0.000) was carried out to test whether the correlation between the variables is adequately enough for factor analysis to be appropriate; and extraction value >0.4 for “communalities” were computed to test the common variance proportion in the variables; and > 60% of the total variance explained of were calculated as presented. These EFA assumptions were recommended by Comrey and Lee [25].

The following tables present the results of EFA of managerial entrepreneurial competencies (MEC), which estimated 15 items of MEC, MEC1 to MEC15 with exception of MEC9 and MEC12 which were excluded in the test of normality and outliers. The value of KMO was .830, this shows that it is higher than the threshold value of 0.5 for the factor analysis validity. This threshold value was maintained by the Bartlett's test of Sphericity at 0.00 significant and which confirmed that the results obtained were significant (Table 3). The Table 3 also showed that all the corresponding anti-images correlation diagonal values measuring sampling adequacy of the 15 items were greater than 0.5. These values indicate that all the EFA assumptions were met for the remaining 12 variables and therefore, it is suitable to run EFA with remaining 12 items.

Table 3 KMO and Bartlett's test / AIs of Managerial Entrepreneurial Competencies

| KMO and Bartlett's Test       |                                 |         |
|-------------------------------|---------------------------------|---------|
| Kaiser-Meyer-Olkin            |                                 | .830    |
| Bartlett's Test of Sphericity | Approx. Chi-Square              | 641.257 |
|                               | df                              | 78      |
|                               | Sig.                            | .000    |
| Item                          | Anti-image Correlation Diagonal |         |
| MEC1                          | .797 <sup>a</sup>               |         |
| MEC5                          | .787 <sup>a</sup>               |         |
| MEC3                          | .908 <sup>a</sup>               |         |
| MEC4                          | .858 <sup>a</sup>               |         |
| MEC6                          | .868 <sup>a</sup>               |         |
| MEC10                         | .778 <sup>a</sup>               |         |
| MEC7                          | .803 <sup>a</sup>               |         |
| MEC8                          | .742 <sup>a</sup>               |         |
| MEC11                         | .813 <sup>a</sup>               |         |
| MEC14                         | .793 <sup>a</sup>               |         |
| MEC13                         | .716 <sup>a</sup>               |         |
| MEC15                         | .860 <sup>a</sup>               |         |

Table 4 displays three components' initial eigenvalues higher than 1, which together accounted for 60.77% of the difference in the actual variables more than the lowest recognized variance explained of 60% as recommended by [23]. This suggested that only three extracted factors had correlative relationships. Correspondingly, the cumulative value of Extraction and Rotation Sums of Squared Loadings were the same, equaling 60.77%. Therefore, the variation described by the initial solution had not been lost because of the latent factors which implied the suitability of the extraction method. Hence, 13 items of MEC were loaded into three factors (Table 4). Factor 1 covered six items which comprised MEC1 (The ability to achieve the mission, vision and strategic objectives of a new venture.), MEC2 (Quality control management in venturing.), MEC5 (Ability

to manage time), MEC3 (Self-control.), MEC4 (Successful planning of the enterprises.) and MEC6 (Demonstration of self-organizational discipline.). Factor 2 covered four items which included MEC10 (Personal relationship.), MEC7 (Ability to prepare a feasibility study.), MEC8 (Making decisions for which they are responsible.) and MEC11 (Ability to develop business plan.). Factor 3 has three items these are MEC14 (Communication for social interaction that touches every sphere of human and organization activities.), MEC13 (Comparing of standard with actual situation.) and MEC15 (Efficient, rational and ethical management of all the resources of the organization.).

Table 4 Total variance explained of Managerial Entrepreneurial Competencies

| Compon ent | Initial Eigenvalues |                |               | Extraction Sums of Square Loadings |                |               | Rotation Sums of Square Loadings |                |               |
|------------|---------------------|----------------|---------------|------------------------------------|----------------|---------------|----------------------------------|----------------|---------------|
|            | Tota l              | % of Varian ce | Cumulati ve % | Tota l                             | % of Varian ce | Cumulati ve % | Tota l                           | % of Varian ce | Cumulati ve % |
| 1          | 4.929               | 37.917         | 37.917        | 4.929                              | 37.917         | 37.917        | 3.568                            | 27.444         | 27.444        |
| 2          | 1.749               | 13.451         | 51.367        | 1.749                              | 13.451         | 51.367        | 2.293                            | 17.641         | 45.085        |
| 3          | 1.222               | 9.401          | 60.769        | 1.222                              | 9.401          | 60.769        | 2.039                            | 15.683         | <b>60.769</b> |
| 4          | .876                | 6.740          | 67.509        |                                    |                |               |                                  |                |               |
| 5          | .800                | 6.153          | 73.662        |                                    |                |               |                                  |                |               |
| 6          | .626                | 4.816          | 78.478        |                                    |                |               |                                  |                |               |
| 7          | .582                | 4.478          | 82.956        |                                    |                |               |                                  |                |               |
| 8          | .506                | 3.892          | 86.848        |                                    |                |               |                                  |                |               |
| 9          | .450                | 3.462          | 90.310        |                                    |                |               |                                  |                |               |
| 10         | .391                | 3.006          | 93.316        |                                    |                |               |                                  |                |               |
| 11         | .350                | 2.689          | 96.005        |                                    |                |               |                                  |                |               |

|    |      |       |         |
|----|------|-------|---------|
| 12 | .269 | 2.069 | 98.073  |
| 13 | .250 | 1.927 | 100.000 |

The Table 5 presents the variance proportion observed in every item in contrast to the other items. As all the obtained values are above 0.4, the extraction communalities obtained through the analysis of the principal components were found satisfactory (Osborne, Costello and Kellow, 2008); [23].

Table 5 Communalities and Matrixes of Managerial Entrepreneurial Competencies

| Communalities |         |      | Component Matrix |      |      |      |
|---------------|---------|------|------------------|------|------|------|
| Items         | Initial | Ext. | Items            | 1    | 2    | 3    |
| MEC1          | 1.000   | .694 | MEC1             | .827 |      |      |
| MEC2          | 1.000   | .634 | MEC2             | .780 |      |      |
| MEC3          | 1.000   | .675 | MEC5             | .774 |      |      |
| MEC4          | 1.000   | .588 | MEC3             | .760 |      |      |
| MEC5          | 1.000   | .629 | MEC4             | .703 |      |      |
| MEC6          | 1.000   | .464 | MEC6             | .601 |      |      |
| MEC7          | 1.000   | .618 | MEC10            |      | .760 |      |
| MEC8          | 1.000   | .603 | MEC7             |      | .730 |      |
| MEC10         | 1.000   | .632 | MEC8             |      | .695 |      |
| MEC11         | 1.000   | .533 | MEC11            |      | .578 |      |
| MEC13         | 1.000   | .606 | MEC14            |      |      | .835 |
| MEC14         | 1.000   | .734 | MEC13            |      |      | .722 |
| MEC15         | 1.000   | .490 | MEC15            |      |      | .576 |

**VII. DISSCUSS**

The result of this study revealed that the model of the managerial entrepreneurial competencies (MEC) had ten important competencies that are accepted by the respondents to be integrated into technical college programs. Therefore, these competencies are discussed as follows:

The ability to achieve the mission, vision and strategic objectives of a new venture; Making decisions for which they are responsible; comparing of standard with actual situation. These findings are in line with the finding of [27]; [28] who found that clear vision and mission of a business and decision making assist in re-investment, delivery and supply of profits judiciously so that it will enhance financial management to achieve excellent business outcome.

Self-control; Personal relationship; Communication for social interaction that touches every sphere of human and organization activities; Efficient, rational and ethical management of all the resources of the organization. Efficient, rational and ethical management of all the resources of the organization. These findings are in agreement with work of Robles and Zárrega-Rodríguez [29] and Rezaeizadeh et al. [30] who identified these competencies among the key managerial competencies needed by every entrepreneur which is valuable for any educational institution dedicated to the development of entrepreneurial competencies to its students. Accordingly, the findings are concurred with the work of Zarefard and Cho [31] which revealed that communication for societal relation with others and use diverse media channels.

Quality control management in venturing; Ability to manage time; Successful planning of the enterprises and Demonstration of self-organizational discipline; Ability to prepare a feasibility study; and Ability to develop business plan. These findings are in agreement with Onweh et al. [32], Njoroge and Gatungu [33] and Medugu and Dawha [34] who stresses the necessity of business plan ability as a vital competencies for every entrepreneur. It has been understood that planning is one of the fundamental competencies of modern business, without good and timely planning, a business can easily be broken. Similarly, Ghina et al. [35] affirmed that business plan was one of the most important entrepreneurial skills found worthy of inclusion in their entrepreneurial program. Therefore, from the above discussion it has been understood that the managerial entrepreneurial competencies found in this study are worthy for inclusion into the curriculum of Nigerian technical colleges for self-reliant.

## **CONCLUSION**

Even though entrepreneurial training to technical college students are vital but entrepreneurial skills are absent in the curriculum of the Nigerian technical colleges. As such the present technical

college curriculum consists only the technical skills thus is too scanty for the production of technicians with an entrepreneurial attitude who can create job opportunities and self-employment upon graduation. As a consequence, technical college students lack appropriate training of entrepreneurship that will enable them acquire desirable and relevant competencies needed for job creation and self-employment.

Therefore, it is imperative to identify managerial entrepreneurial competencies for self-employment that would enable the development of a MEC framework for effective integration at the technical colleges to allow the students obtain both technical and entrepreneurial skills. The study recognized the need for integrating entrepreneurial skills into technical college programs curriculum for self-employment and thereby MEC were identified as key competencies required for integration into the curriculum through EFA. Therefore, 13 items of MEC were loaded into three factors. Consequently, the study revealed important competencies required for integration into technical college curriculum such as the ability to achieve the mission, vision and strategic objectives of a new venture, personal relationship and comparing of standard with actual situation among others.

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